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1. The Moscow Motor and Tractor Electrical Equipment Factory No. 1 (Zavod Avtotraktornogo Elektrooborudovaniya No. 1, abbreviated form ATE-1), is located at 21 Elektrozavodskaya Ulitsa, Stalin Rayon, Moscow. This is the same address as the Moscow Electric Lamp and Tubee Factory No. 632 and the Moscow Transformer Factory. All three factories previously formed the Elektrozavod Combine and this name is retained up to the present. The factory is directly subordinate to the Chief Directorate of Motor Vehicle Electrical Equipment (Glavavtoelektropribor), situated at No. 23 Neglinnaya Ulitsa, Moscow, which is part of the Ministry of Automobile and Tractor Industry of the USSR.

History

2. The ATE-1 factory has its origin in the Radio electrical factory, which was organized in 1922. When the Elektrozavod Combine was formed in 1927, the Radio Factory became part of it and changed its production to that of motor and tractor electrical equipment, at the same time changing its name to Motor and Tractor Electrical Equipment Factory (ATE). Later, as another factory of that name was founded in Moscow, the first was allotted the number 1 and the second factory the number 2.

3. Before the war the factory had no specialized production and manufactured a great variety of electrical equipment such as generators, starters, magnetos, ignition coils, relays, distributors, signaling appliances, and other articles, including simple switches and switch buttons.

4. During the war the factory worked on specialized products and manufactured electrical equipment for military trucks, tractors, and tanks.

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5. After the war the Chief Directorate of Motor Vehicle Electrical Equipment of the Ministry of Automobile and Tractor Industry of the USSR carried out a considerable degree of specialization within its factories (Moscow ATE-1 Factory, Moscow ATE-2 Factory, Tyumen ATE Factory, Leningrad Carburetor Factory, Kuybyshev Katekh Factory, Vladimir Avtopribor Factory, and Leningrad Avtoarmatura Factory). The Moscow ATE-1 Factory was allotted as its main output the production of motor vehicle, tractor, and tank generators, relay regulators and other kinds of relays, and self-starters. Generators, self-starters and relay regulators are also produced by the Kuybyshev Katekh Factory. The production of ignition equipment, such as coils, ignition distributors, magnetos, spark plugs, and signaling appliances, was allotted to the Moscow ATE-2 Factory.

6. After the conclusion of hostilities, the factory went over in its main products from a 6-volt to a 12-volt tension system. This insures reliable starting of modern car engines in the climatic conditions prevailing in the USSR, and provides for more reliable ignition. The power of mass-produced generators and self-starters has been at least doubled in comparison with those of prewar manufacture. As a result of improved design, the amount of metal used in producing individual articles has considerably decreased. In generators of some types this decrease is as much as 40 per cent. After the war, as the result of the introduction of specialization, the ATE-1 Factory began to pay great attention to improving the quality of generators, self-starters, and relay regulators in order to increase their reliability and life, and to the unification of equipment of several types. Thus, in 1949, generators for GAZ-51, Pobeda, and ZIS-150 automobiles were successfully unified. Unification of other groups of generators is now being carried out.

Production

7. At the present time the ATE-1 Factory is the main supplier of generators, relay regulators, and self-starters to the motor and tractor industry of the USSR and to the Ministry of Transport Machine Construction Industry (Transportnoye Mashinostroenye) for its tanks and military motor vehicles. Apart from its main output, the factory also produces a small quantity of other kinds of electrical equipment such as light electric motors for starting (razzhig) producer-gas driven cars, motors for heating the ZIS-54, and magneto dynamos (magdino MG-10) for motorcycles of the Kiev Motorcycle Factory (K-1B motorcycles). The present-day output of the factory can be divided into two categories, that is, old-type equipment for early makes of vehicles such as GBF-4600 and GM-71 old-type generators, and new-type equipment for post-war vehicles such as G-20 and G-28 type generators. Output of the old-type equipment is decreasing annually and, at the present time, comprises about 20 per cent of the total output.

8. Great assistance is being rendered to the factory by the Scientific Research Institute of Motor Appliance Construction, which was organized after the war and is situated at the same address as the factory. Scientific workers of the institute are working on problems of how to improve the operation of commutator and brush devices, problems of selecting specially hard commutator copper, and problems connected with brushes and brush holders, with new alloys for insuring stability of relay-regulator terminals, with creating carbon resistances of a constant character, and with finding plastic material substitutes for metal.

9. The following generators are produced for the motor vehicle and tractor industry:

a. G-11 motorcycle generator for the M-72 motorcycle.
This generator works with a RR-1 or RR-31 relay regulator.

Power - 45 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.5 kg.
When running free-voltage 6.5 volts, 1250 rpm.
When on load - current 7 amps, voltage 6.5 volts, 1900 rpm.
Maximum permissible rpm - 7500.

b. G-35 motorcycle generator for the M-1-A motorcycle.
Works with a RR-30 relay regulator.
Power - 35 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.5 kg.
When running free - voltage 6.4 volts, 1500 rpm.
When on load - current about 7.5 amps, voltage 8 volts, about 4400 rpm.
Maximum permissible rpm - 6000.

c. G-36 motorcycle generator for IZh-350 and K-125 motorcycles.
Power - 45 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.45 kg.
When running free - voltage 6.4 volts, 1500 rpm.
When on load - current about 7 amps, voltage 8 volts, about 4300 rpm.
Maximum permissible rpm - 6000.

d. GBF-4105 and GBF-4600 old-type generators for GAZ-AA, GAZ-MM, ZIS-5, YaG-6 early makes of motor vehicles (these are all gasoline-driven trucks with four-stroke engines).
These generators work with a TsB-4118 reverse current relay.
Power - 60 watts and 80 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.6 kg.
Exciter winding resistance - about 1.25 ohms.
When running free - voltage 6.4 volts, 700 rpm.
When on load - current 13 amps, voltage 8 volts, about 1600 rpm.
Maximum permissible rpm - 4500 and 3800.
The generator armature has 14 grooves and 28 commutator plates.
The PEBO type wire is 1.16 mm in diameter.
The PE exciter winding wire is 1.16 mm in diameter.
Two poles.

e. GM-71 and GM-71 T old-type generators for M-1 (GAZ M-1) and GAZ-67 early makes of passenger cars. They work with a TsB-4118 reverse current relay.
Power - 100 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.6 kg.
When running free - voltage 6.4 volts, 850 rpm.
When on load - current 13 amps, voltage 8 volts, about 1600 rpm.
Maximum permissible rpm - 4500.

f. G-20 and G-21 new-type generators for the new Pobeda (GAZ M-20) passenger car and for GAZ-51 and GAZ-63 gasoline trucks.
They work with an RR-12 relay regulator.
G-20 and G-21 differ from one another only in the type of pulley (shkiv) used.
The G-21 generator pulley has fins, and serves simultaneously as a fan for cooling the generator.
These generators are of the two-pole, two-brush, shunt type.
Power - 220 watts.

Nominal voltage - 12 volts.
Spring pressure on brushes - about 1.3 kg.
When running free - voltage 15 volts, 900 rpm.
When on load - current 18 amps, voltage 15 volts, 1550 rpm.
Maximum permissible rpm - 7500.

g. G-15 generator for ZIS-150 and ZIS-151 motor trucks with gasoline engines. Works with an RR-15 relay regulator.
It is of the two-pole shunt type with draft ventilation.
Power-150 watts (has also been built with 165-watt power).
Nominal voltage - 12 volts.
Spring pressure on brushes - about 1.3 kg.
When running free - voltage 12.5 volts, 800 rpm.
When on load - current 18 amps, voltage 12.5 volts, 1200 rpm.
Maximum permissible rpm - 4500.
The armature rotates on two ball bearings.
Covers on the commutator and driving sides have holes through which air is drawn by a ventilator to cool the commutator and the generator windings. Internal ventilation has resulted in very slight (40-50°C) heating of generator windings.
The ventilator is cast in one piece with the pulley.

h. G-28 new-type generator for the new Moskvich passenger car.
It works with an R-28 reverse current relay.
The generator is of the two-pole, three-brush type.
Power - 100 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.45 kg.
Normal performance - 16-18 amps at 2700-3000 rpm of the armature.
Voltage - 7.8 volts.
Maximum permissible rpm - 5600.
The generator is air-coiled by a fan on the driving pulley.
The third brush is fitted on a sliding plate (podvizhnaya plastinka) on the rear cover of the generator. By bringing the third brush into operation the generator's maximum performance can be raised to 20-21 amps.
There are 15 grooves in the armature and 30 commutator plates.
PE type wiring, 1 mm diameter.
Exciter winding - PEL type wiring, 1 mm diameter.

i. G-25 generator for the YaAZ-200 truck with a two-stroke diesel engine.
Works with an RR-25 relay regulator.
Power - 250 watts.
Nominal voltage - 12 volts.
Spring pressure on brushes - about 1.5 kg.
When running free - voltage 12 volts, 900 rpm.
When on load - current 20 amps, voltage 12.5 volts, 1600 rpm.

j. GL-41 generator for ZIS-101 and ZIS-102 (sic) gasoline passenger cars.
Works with an RZ-69 charge relay (rele zaryada).
Power - 150 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - 0.6 kg.
When running free - voltage 6.4 volts, 850 rpm.
When on load - current about 27 amps, voltage 8 volts, 1800 rpm.
Maximum permissible rpm - 4500.
There are 17 grooves in the armature, and 33 commutator plates.
PEBO type wiring, 1.3 mm diameter.
Exciter winding: PE type wiring, 1.16 mm diameter.
Four poles.

k. G-16 generator for ZIS-110 passenger cars. Works with an RR-11 relay regulator.
Power - 250 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 1.4 kg.
When running free - voltage 6.5 volts, 900 rpm.
When on load - current 35 amps, voltage 8.5 volts, 1800 rpm.
Maximum permissible rpm - 7500.

l. GA-27 generator for the ZIS-8 four-stroke gasoline motor bus, and the ZIS-21 producer-gas truck. It works with an RRA-44 relay regulator.
Power - 250 watts.
Nominal voltage - 12 volts.
Spring pressure on brushes - about 0.7 kg.
When running free - voltage 12.5 volts, 860 rpm.
When on load - current 20 amps, voltage 12.5 volts, 1250 rpm.
Maximum permissible rpm - 3000.

m. G-62 generator for the ZIS-16 motor bus (four-stroke gasoline engine).
Works with an RRA-304 relay regulator.
Power - 400 watts.
Nominal voltage - 12 volts.
Spring pressure on brushes - about 0.7 kg.
When running free - voltage 12.5 volts, 900 rpm.
When on load - current 32 amps, voltage 12.5 volts, about 1450 rpm.
Maximum permissible rpm - 4000.

n. GBT-4541 generator for the KhTZ-STZ agricultural wheel tractor.
Works with a VR-4550 voltage regulator.
Power - 65 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.6 kg
When running free - voltage 6.5 volts, 850 rpm.
When on load - current 10 amps, voltage 6.5 volts, about 1200 rpm.
Maximum permissible rpm - 2300.

o. GBT-4692 generator for the KD-35 general-purpose caterpillar tractor.
Works with a VR-4550 voltage regulator. All other particulars are almost identical to those of the GBT-4541.

p. G-60 bicycle dynamo.

q. GAU-4101 generator for the ChTZ-S-65 caterpillar tractor. Works with a GVR-4550 voltage regulator.
Power - 100 watts.
Nominal voltage - 6 volts.
Spring pressure on brushes - about 0.7 kg.
When running free - voltage 6 volts, 700 rpm.
When on load - current 15.5 amps, voltage 6.5 volts, 950 rpm.
Maximum permissible rpm - 1980.

r. GA-08 generator for the KT-12 caterpillar tractor (four-stroke producer-gas engine). Works with an RRT-17 regulator.
Power - 190 watts.
Nominal voltage - 12 volts.

s. G-066 generator (sometimes called the G-66 generator) for the S-80 caterpillar tractor.
Power - 250 watts.
Nominal voltage - 12 volts.

t. GT-4563 generator for the Voroshilovets caterpillar tractor (375 hp diesel engine). Works with an RRT-4576 voltage regulator.
Power - 1000 watts.
Nominal voltage - 24 volts.

u. G-43 generator for STZ-5 caterpillar tractors.
Power - 120 watts.
Voltage - 12 volts.

v. G-52A generator for the ZIS-154 motor bus (two-stroke diesel engine).
Power - 1000 watts.

10. The following relay regulators, reverse current relays, and charge relays are produced:

a. RR-15 Relay regulator. Works with a 12-volt G-15 generator. It consists of a reverse current relay, a voltage regulator, and a current-limiting device (ogranichitel toka). The relay regulator has a rigid zinc-alloy base cast under pressure, retaining its shape when jolted or strained. The cover is also pressure cast and has protective padding to keep out dust and moisture. The reverse current relay has two windings, that is, a series winding and a parallel (shunt) winding. The series winding is of PBD copper wire, 3 mm diameter naked and 3.8 mm insulated. Total number of turns - 17, resistance 0.01 ohms. The shunt winding is of PEL copper wire, 0.23 mm naked and 0.255 mm insulated. Total number of turns - 1870, resistance 40 ohms. To lessen the influence of temperature on the shunt winding resistance, part of it (about 50 turns) is wound from PKEBO constantan wire, 0.3 mm diameter naked and 0.49 mm insulated, resistance 21 ohms. Gap between terminals is 0.5 mm. Armature gap - 1.3 mm. Switch-on voltage (napryazheniye vklyucheniya) - 13 volts. Switch-on reverse current (obratnyy tok vklyucheniya) - 0.5 amps. The voltage regulator consists of a shunt winding of PEL copper wire, 0.47 mm diameter naked and 0.515 mm insulated, with 1990 turns, about 15.6 ohms resistance, and a compensating winding of PEL copper wire, 1 mm diameter naked and 1.07 mm insulated, with 50 turns, 0.144 ohms resistance. Armature gap - 15 mm. Gap between terminals - 0.5 mm. The current-limiting device consists of a series winding of PBD copper wire, 1.74 mm diameter naked and 2.01 mm insulated, with 56 turns, connected in series with the generator armature circuit and an accelerating winding (uskoryayushchaya obmotka) of PEL copper wire 0.86 mm diameter naked, with 39 turns, 0.05 ohms resistance, connected in series with the exciter winding circuit. Gap between terminals - 0.5 mm. Armature gap - 1.5 mm. Value (velichina) of additional resistance - 90 ohms, 15 ohms, 90 ohms.

b. RRA-44 Relay regulator. Works with a 12-volt GA-27 generator. In the reverse current relay the gap between terminals is 0.8 mm and armature gap - 2 mm. The switch-on voltage is 13 volts and the switch-off reverse current - 3 amps. The series winding is of PBD copper wire, 3.53 mm diameter naked and 3.83 mm insulated. Number of turns - 15, resistance - 0.0027 ohms. The shunt winding is of PE copper wire, 0.25 mm diameter naked and 0.27 mm insulated. Number of turns - 1350, resistance - 26 ohms. The temperature compensating winding is of PKEBO constantan wire, 0.29 mm diameter naked

and 0.42 mm insulated. Number of turns - 51, resistance - 24 ohms. Voltage regulator winding: main winding is of PE copper wire, 0.35 mm diameter naked and 0.38 mm insulated. Number of turns - 1840, resistance - 20 ohms. Temperature compensating winding is of PKEBO constantan wire, 0.29 mm diameter naked and 0.42 mm insulated. Number of turns - 62, resistance - 40 ohms. Compensating winding (korrektiruyushchaya obmotka) is of PBD copper wire, 3.53 mm diameter naked and 3.83 mm insulated. Number of turns - 4, resistance - 0.0006 ohms. Accelerating winding (uskoryayushchaya obmotka) is of PE copper wire, 0.23 mm diameter naked and 0.25 insulated, 930 turns, 40 ohms resistance, and of PKEBO constantan wire, 0.23 mm diameter, naked and 0.34 mm insulated, 64 turns, 81 ohms. Compensating winding (vyravnivayushchaya obmotka) is of PE copper wire, 1 mm diameter naked and 1.05 mm insulated, 40 turns, 0.1 ohms resistance. Additional resistance - PKEBO constantan wire, 0.23 mm diameter naked and 0.34 mm insulated, 81 ohms resistance. Armature gap is 1.9 mm.

c. TsB-4118 Reverse Current Relay. Works with GBF-4105, GBF-4600, GM-71A, GM-71T, and GAU-42 generators. This relay is mass-produced by the factory. The series winding is of PE copper wire, 1.81 mm diameter naked and 1.87 mm insulated. Number of turns - 21, resistance 0.006 ohms. The shunt winding is of PE copper wire, 0.17 mm diameter naked and 0.185 mm insulated. Number of turns - 1240, resistance - 36 ohms. Gap between terminals - 0175 mm. Armature gap - 0.5 mm.

d. RZ-69 Charge Relay (rele zaryada). Works with a GL-41 generator. The series winding is of PBO copper wire, 1.81 mm diameter naked and 2.05 mm insulated, with 30 turns and 0.007 ohms resistance. Additional resistance - a Nikhrom (Nichrome) wire, 0.8 mm diameter and a resistance of 1 ohm. Gap between terminals - 0.75 mm. Armature gap 0.5 mm. Switch-on current - 8 amps. Switch-off reverse current - 6 amps.

e. RR-1 Relay regulator. Works with a 6-volt G-11 generator.

f. RR-11 Relay regulator. Works with a 6-volt G-16 generator.

g. RR-12 Relay regulator. Works with 12-volt G-20 and G-21 generators.

h. RR-25 Relay regulator. Works with a 12-volt G-25 generator.

i. RR-30 Relay regulator. Works with a 6-volt G-35 generator.

j. RR-31 Relay regulator. Works with a 6-volt G-11 generator.

k. RRA-257 Relay regulator. Works with a 12-volt G-43 generator.

l. RS-28 Reverse Current Relay. Works with a 6-volt G-28 generator.

11. The following are produced:

a. MAF-4006 starter with inertia (inertsionnyy) gear engagement, for GAZ-A, GAZ-AA, GAZ-67, GAZ-MM, and GAZ-M1 motor vehicles - 6 volts, 0.9 hp.

b. MAF-4007 starter with inertia gear engagement for ZIS-5, YaG-4, and YaG-6 motor vehicles - 6 volts nominal, 0.9 hp.

c. MAF-31 starter with inertia gear engagement for ZIS-6, ZIS-8, ZIS-16, and ZIS-21 motor vehicles - 12 volts nominal, 2 hp.

d. ST-28 starter with mechanical lever (rychazhno-mekhanicheskiy) gear engagement for the Moskvich motor car. It has a VK-28 engaging device. The starter is of the four-pole type with series excitation. When starting the engine, the current attains a strength of from 150 amps (warm engine) to 300 amps (cold engine in winter), 6 volts nominal, 0.6 hp.

e. ST-8 starter with mechanical lever gear engagement for GAZ-51 and M-20 motor vehicles. Maximum torque - about 2.7 kg., 12 volts nominal, 1.7 hp. Four-pole, four-brush DC motor with series excitation.

f. ST-20 starter with mechanical lever gear engagement, for GAZ-63 motor vehicles - 12 volts nominal, 1.7 hp.

g. ST-23 starter with mechanical lever gear engagement and electromagnet, for ZIS-101 motor vehicles - 6 volts nominal, 1 hp.

h. ST-10 starter with mechanical lever gear engagement and electromagnet, for ZIS-110 motor vehicles - 6 volts nominal, 1.2 hp.

i. ST-15 starter with mechanical lever gear engagement and electromagnet, for ZIS-150 and ZIS-151 motor vehicles - 12 volts nominal, 1.8 hp.

j. ST-25 starter with mechanical lever gear engagement and electromagnet, for YaAZ-200 motor vehicles - 24 volts nominal, 8 hp.

k. ST-30 starter with mechanical lever gear engagement and electromagnet. Other particulars similar to ST-25. 50X1-HUM

l. ST-64 starter for Voroshilovets tractors - 24 volts nominal, 6 hp.

12. [redacted]

a. Generators of all types, including motorcycle and tanks-320,000
b. Self-starters of all types - about 380,000.
c. Relay regulators and all kinds of relays - about 510,000.

Personnel

13. The top personnel are as follows:

A.A. Olenin - Chief engineer and acting director of the factory.
V.G. Kopylov - Production chief.
G.P. Vostryakov - Engineer, chief technician.
L.S. Ryzhkov - Chief mechanic.
V.G. Alekseyev - Secretary of the party organization.

14. The approximate number of operatives is 4,200. Work is carried out in three shifts. The night shift is one of seven hours.

15. The following is a list of departments and some department heads:

a. Motorcycle generator (abbreviated motorgenerator) shop. Head - Razzhivin, (fnu).

b. Large generator shop. Head - Zubkov, (fnu).

c. Small generator shop. Head - Kurepin, (fnu).

d. Self-starter shop. Head - Boldyrev, (fnu).

e. Electrical machine assembly shop. Head - Gorkin, (fnu).

f. Apparatus shop (Apparatnyy tsekh). Head - Gerasimova, (fnu).

g. Electrical appliances assembly shop. Head - Mansurova, (fnu).

h. Automatic shop. This shop has a line of 14 automatic machine tools.

i. First machine shop (Mekhanicheskiy tsekh).

j. Second machine shop.

k. Pressing shop. Head - Pokrovskiy, (fnu).

l. Tool shop. Head - Ozerov, (fnu).

m. Experimental shop.

n. Power drive shop. (Tsekh mekhanicheskikh privodov).

o. Erecting and building shop (montazho-stroitelnyy tsekh). Head - Mylnikov, (fnu).

p. Chief mechanic's shop.

q. Chromium-plating shop.

r. Foundry.

The factory has an electrical machine laboratory and a designing office.

Miscellaneous

16. During the postwar Five-Year Plan, production has increased considerably. A large number of conveyer belts have been introduced into various workshops. These conveyers include the following: generator armature and assembly conveyer, self-starter armature winding and assembly conveyer, mass production lines for producing armature shafts and generator poles, and relay regulator assembly conveyers.

17. In recent years new equipment planned in the design office of the factory and in the Scientific Research Institute of Motor Appliance Construction and built in the experimental workshop of the factory, has been introduced into the factory. This equipment consists of special automatic and semi-automatic machine tools and units for turning out difficult components for such equipment as generators and self-starters. The following are examples: commutator groove, automatic milling machine, coil-winding bench, and a semi-automatic armature-winding bench which has increased labor efficiency tenfold. Foundry equipment has improved considerably. Some castings are cast under pressure on machines built at one of the Moscow factories.

18. In the autumn of 1951, the factory received from the Ministry of Automobile and Tractor Industry of the USSR the title Enterprise of Collective Stakhanovite Labor. The factory is resolved to live up to this title and, at a large meeting held in January 1952, the factory personnel pledged themselves to make the factory an Enterprise of Excellent Quality during this year.